

REMARKSStatus of the Claims

Claims 2-8, 12 and 14-35 are pending in this application. No claims have been canceled or added. Claim 12 is indicated as allowable. Claims 2, 34 and 35 have been amended so that (II) repeating units is not an optional limitation. Claim 19 has been amended to clarify an improper Japanese translation of the PCT application. Claims 23, 28 and 33 have been amended to clarify an improper Japanese translation of the PCT application. As such, no new matter has been added by any of the above claim amendments.

Objection to the Specification

The Examiner objects to Table 3 on page 35 of the specification. Applicants amend the specification to place Table 3 in column and row format. As such, the objection should be withdrawn.

Rejections Under 35 U.S.C. § 112, Second Paragraph

The Examiner rejects claims 6, 19-20, 22-23, 27-28, 33 and 35 as indefinite. Applicants traverse the rejection and respectfully request the withdrawal thereof.

The Examiner rejects the phrase "monomer having conjugated double bonds or one or two carbon to carbon double bonds" because allegedly claim 6 does not further limit claim 2. Applicants submit that in view of the amendments to claim 2, claim 6 does further limit claim 2. To clarify the phrase, "a monomer having

conjugated double bonds or one or two carbon-carbon double bonds" means that the monomer may have conjugated double bonds or the monomer may have one or two carbon-carbon double bonds. As such, it is clear that claim 6 is more limiting than claim 2 and the rejection should be withdrawn.

The Examiner rejects claims 19, 20, 22 and 27 as indefinite because the term "outside" is confusing. Applicants submit that the term outside is a mistranslation from Japanese to English. Applicants amend the claims to clarify the proper language to convey that the liquid is propelled out of the container. As such, the rejection should be withdrawn.

The Examiner rejects claims 23, 28 and 33 for the phrase "using water". Applicants amend the claims to clarify the phrase using water. As such, the rejection should be withdrawn.

The Examiner rejects claim 35 for the definition of  $A^2$ , because it is not clear how "a hydrophilic group" is different from "a group having a hydrophilic group". Applicants submit that a group containing a hydrophilic group is a hydrophilic group bonded to a divalent organic group, such as a linear or branched alkylene group, phenylene group, polyether group, polyester group and polyurethane group. Examples of such are  $-O-CH_2CH_2-OH$ ,  $-O-CH_2CH(OH)CH_2$ ,  $-O-(CH_2)_6-OH$ ,  $-O-(CH_2CH_2O)_9-H$  and  $-CONHCH_2OH$ . It is clear that the phrases connote different substituents and are not indefinite. As such, the rejection should be withdrawn.

Rejections Under 35 U.S.C. § 102(b) and § 103(a)

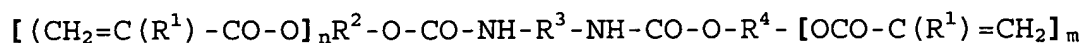
The Examiner rejects claims 1-8, 12 and 14-33 as anticipated by or obvious over JP 272,988 Katsuji et al. (JP '988) or Misaizu et al. USP 5,068,295 (Misaizu '295). Applicants traverse the rejection and respectfully request the withdrawal thereof.

**The Present Invention**

The present invention is directed to a composition comprising a copolymer as claimed and a film-forming auxiliary as claimed which functions as a water and oil repellent. The present invention can achieve an advantageous effect, which cannot be achieved by the references. The composition or copolymer of the present invention can impart high water- and oil-repellency, even if the composition is dried at a low temperature, such as room temperature, as described in page 2, lines 5-7 of the specification.

**Distinctions between Present Invention and JP '988**

JP '988 discloses water and oil repellent composition comprising a polymerizable compound having a polyfluoroalkyl group and polyvalent (meth)acrylate having a urethane bond of the formula:



(wherein  $n+m$  is from 2 to 6) (cf. claim 1). The monomers used in Examples and Comparative Examples in JP '988 are as follows:

Type and amount (weight parts) of used monomers in JP '988

	FA	2EHMA	VCl	N-MAM	Urethane-containing monomer
Ex. 1	60	38	0	0	2
Ex. 2	60	0	36	0	4
Ex. 3	60	36	0	0	4
Ex. 4	60	36	0	0	4
Ex. 5	60	34	0	4	2
Ex. 6	60	30	0	0	10
Com. Ex. 1	60	36	0	0	0
Com. Ex. 2	60	36	0	0	0.05
Com. Ex. 3	60	29	0	0	11

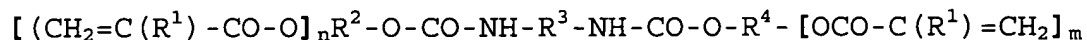
FA: perfluoroalkyl group-containing acrylate, corresponding to repeating unit (I)

2EHMA: 2-ethylhexyl methacrylate, corresponding to repeating unit (III)

VCl: vinyl chloride, corresponding to repeating unit (V)

N-MAM: N-methylol acrylamide, corresponding to repeating unit (IV).

The urethane-containing monomer in JP '988 has the formula:



wherein  $n+m$  is from 2 to 6. The urethane-containing monomer in JP '988 has at least two carbon-carbon double bonds. In JP '988, it

is essential that the urethane containing monomer has at least two carbon-carbon double bonds so as to achieve the objective of JP '988, namely to give good durability.

JP '988 fails to disclose or suggest the combination of repeating units (I), (II) and (III) with the repeating unit (IV) or (V) as in the present invention. The working examples of JP '988 do not describe the recited combination of the present invention. Moreover, JP '988 fails to disclose or suggest only one carbon-carbon double bond.

JP'988 fails to support the alleged prima facie case of obviousness. According to MPEP 2143.01 and In re Rouffet, 149 F.3d 1350, 47 USPQ2d 1453, there must be some teaching or suggestion within the cited reference to motivate one to modify the reference to arrive at the present invention. In the absence of a clear teaching towards one carbon carbon double bond, one of ordinary skill in the art would not be motivated by the disclosure of JP '988 to modify the reference to arrive at the present invention.

#### **Distinctions between Present Invention and Misaizu '295**

Misaizu '295 discloses a water and oil repellent agent comprising a copolymer of a first vinyl monomer having a perfluoroalkyl group, a second vinyl monomer having a polyorganosiloxane chain and a third vinyl monomer having a isocyanate group or a blocked isocyanate group. The working examples of Misaizu '295 describe a copolymer corresponding to the

combination of repeating units (I) and (II) or repeating units (I), (II) and (III).

Misaizu '295 fails to disclose or suggest that high water repellency and oil repellency can be achieved when the repeating units (I), (II) and (III) are combined with at least one of the repeating units (IV) and (V).

Applicants also submit the unsigned Declaration of co-inventor Mr. Kashiwagi, which demonstrates that the present invention has superior properties over Misaizu '295. (A signed declaration will follow.) Mr. Kashiwagi compared the present invention in experiment 1 with Misaizu '295 in comparative experiment 1. Please see Table A in the declaration, which shows that the water and oil repellent of experiment 1, the present invention with the repeating units (I), (II), (III), (IV) and (V), has a much better water repellency and oil repellency than comparative experiment 1, Misaizu '295, which lacks repeating units (IV) and (V). From these experiments it is evident that repeating units (IV) and (V) impart the superior properties.

As such, the Examiner has not made a prima facie case of obviousness. Pursuant to MPEP 2143 and In re Vaeck, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991), each and every element of the claimed invention must be disclosed or suggested by Misaizu '295. Since, essential limitations of the claimed invention are not

suggested by Misaizu '295, the Examiner has not made a prima facie case of obviousness and the rejection should be withdrawn.

**Distinctions between Present Invention and JP '695**

The Examiner also rejects claims 34 and 35 as anticipated by or obvious over JP 2015695 (JP '695) or JP 5214197 (JP '197). Applicants traverse the rejection and respectfully request the withdrawal thereof.

JP '695 discloses a moisture-resistant electronic component, which is coated with a polymer having a fluoroalkyl group and a functional group. JP '695 discloses that the polymer may usually be a copolymer prepared from a polymerizable compound having a fluoroalkyl group and a polymerizable compound having a functional group, and a copolymer from these compounds and an other polymerizable compound. JP '695 discloses that examples of the functional group include a hydroxyl group. JP '695 also discloses that the other polymerizable compound includes, for example, vinyl chloride, acrylic acid, alkyl acrylate ester, methacrylic acid, alkyl methacrylate ester and the like. The working examples of JP '695 at best disclose a copolymer corresponding to the combination of repeating units (I), (III) and (IV) of the present invention.

JP '695 fails to disclose or suggest a polymer having repeating units (I), (II) and (III) together with (IV) or (V) as recited by the present invention.

Since, JP '695 does not disclose or suggest each and every element of the present invention, the Examiner has failed to make a prima facie case of obviousness according to MPEP 2143 and the rejection should be withdrawn.

**Distinctions between Present Invention and JP '197**

JP '197 discloses a water and oil repellent agent comprising a polymer prepared from an acrylate having perfluoroalkyl group and a (meth)acrylate having a long chain alkyl group. JP '197 discloses that a (meth)acrylate having a urethane bond may be incorporated into the polymer. The working examples of JP '197 describe a copolymer corresponding to the combination of repeating units (I), (II) and (III).

JP '197 fails to disclose or suggest a polymer having repeating units (I), (II) and (III) together with (IV) or (V). Likewise, JP '197 fails to disclose each and every element of the claimed invention. As such, according to MPEP 2143, the examiner has failed to make a prima facie case of obviousness and the rejection should be withdrawn.

**Conclusion**

As Applicants have addressed and overcome all objections and rejections in the Office Action, Applicants respectfully request that the rejections be withdrawn and that the claims be allowed.

The Examiner is respectfully requested to enter this Reply After Final in that it raises no new issues. Alternatively, the



Examiner is respectfully requested to enter this Reply After Final in that it places the application in better form for Appeal.

Pursuant to 37 C.F.R. § 1.17 and 1.136(a), Applicants respectfully petition a three (3) month extension of time for filing a response in connection with the present application. The required fee of \$920.00 is attached hereto.

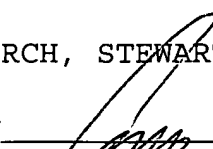
Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact the undersigned below, to conduct an interview in an effort to expedite prosecution in connection with the present application.


**Attached hereto is a marked-up version of the changes made to the application by this Amendment.**

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

Respectfully submitted,

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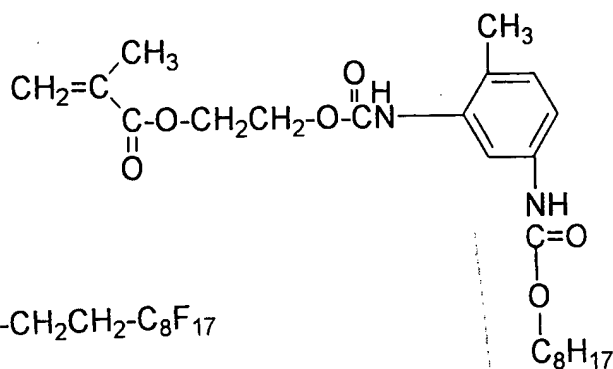
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VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE SPECIFICATION

Table 3

Monomer a



Monomer b

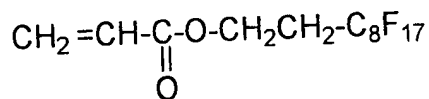


Table 3

Monomer a	$\text{CH}_2=\text{C}(\text{CH}_3)\text{C}(=\text{O})\text{OCH}_2\text{CH}_2\text{O}\overset{\text{O}}{\parallel}\text{CN}-\text{C}_6\text{H}_4-\text{NH}\overset{\text{O}}{\parallel}\text{C}-\text{O}-\text{C}_8\text{H}_{17}$
Monomer b	$\text{CH}_2=\text{CH}-\overset{\text{O}}{\parallel}\text{C}-\text{O}-\text{CH}_2\text{CH}_2-\text{C}_8\text{F}_{17}$

**IN THE CLAIMS:**

Please amend the claims as follows:

2. (Amended) A composition comprising

(A) a copolymer which comprises

(I) repeating units which are derived from a monomer having a fluoroalkyl group, a carbon-carbon double bond, and optionally a urethane or urea bond,

(II) [optional] repeating units which are derived from a monomer having a urethane or urea bond and one [a] carbon-carbon double bond, but no fluorine atom,

(III) [optional] repeating units which are derived from a monomer having a carbon-carbon double bond, the homopolymer of said monomer having a glass transition temperature (T<sub>g</sub>) of 50°C or less,

(IV) optional repeating units which are derived from a monomer having a hydrophilic group and a carbon-carbon double bond, and

(V) optional repeating units which are derived from a monomer having a chlorine atom and a carbon-carbon double bond  
and

(B) a film-forming auxiliary consisting of an organic solvent which dissolves or swells the copolymer,  
wherein at least one of the repeating units (IV) and the repeating units (V) is essential, and said film-forming auxiliary (B) has a

solubility parameter (sp) at 25°C in the range between 8 and 11, said film-forming auxiliary (B) is at least one solvent selected from the group consisting of alcohols, glycol ethers, linear or cyclic silicones, esters, diesters, ketones and ethers, and the composition is in the form of an aqueous dispersion of the copolymer dispersed in a medium comprising water in the presence of a nonionic, cationic or anionic emulsifier.

**19.** (Amended) A water and oil repellent product comprising a water and oil repellent as claimed in claim 17 which is charged in a container equipped with a mechanism for spraying a liquid [in] outside of said container [outside].

**20.** (Amended) A water and oil repellent product comprising a water and oil repellent as claimed in claim 17 which is charged in a container equipped with a mechanism for propelling a liquid [in] outside of said container [outside] using a pressure.

**22.** (Amended) A water and oil repellent product comprising a water and oil repellent as claimed in claim 21 which is charged in a container equipped with a mechanism for foaming and propelling a liquid [in] outside of said container [outside].

**23.** (Thrice Amended) A method for imparting water and oil repellency to a substrate comprising applying a composition as claimed in any one of claims 1 to 14 on said substrate by spraying, coating or dipping by using a water and oil repellent product as claimed in any one of claims 18 to 20 and 22.

**27.** (Amended) A water and oil repellent product comprising a water and oil repellent as claimed in claim 25 which is charged in a container equipped with a mechanism for spraying a liquid [in outside of said container [outside].

**28.** (Thrice Amended) A method for imparting water and oil repellency to a substrate comprising spraying a composition as claimed in any one of claims 1 to 14 on said substrate by using a water and oil repellent product as claimed in claim 27.

**33.** (Thrice Amended) A method for imparting water and oil repellency to a substrate comprising applying a composition as claimed in any one of claims 1 to 14 on said substrate by using a water and oil repellent product as claimed in claim 30 or 32.

**34. (Amended)** A copolymer comprising

(I) repeating units which are derived from a monomer having a fluoroalkyl group, a carbon-carbon double bond, and optionally a urethane or urea bond,

(II) repeating units which are derived from a monomer having a urethane or urea bond and one [a] carbon-carbon double bond, but no fluorine atom,

(III) repeating units which are derived from a monomer having a carbon-carbon double bond, the homopolymer of said monomer having a glass transition temperature (T<sub>g</sub>) of 50°C or less,

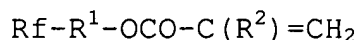
(IV) optional repeating units which are derived from a monomer having a hydrophilic group and a carbon-carbon double bond, and

(V) optional repeating units which are derived from a monomer having a chlorine atom and a carbon-carbon double bond,

wherein at least one of the repeating units (IV) and the repeating units (V) is essential.

**35. (Amended)** A copolymer comprising

(I) repeating units which are derived from a monomeric compound of the formula:



wherein R<sub>f</sub> is a linear or branched fluoroalkyl group having 3 to 20 carbon atoms;

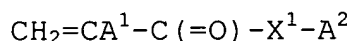
$R^1$  is a linear or branched alkylene group having 1 to 20 carbon atoms, a group of the formula:  $-\text{SO}_2\text{N}(\text{R}^3)\text{R}^4-$  or a group of the formula:  $-\text{CH}_2\text{CH}(\text{OR}^5)\text{CH}_2-$  in which  $\text{R}^3$  is an alkyl group having 1 to 10 carbon atoms,  $\text{R}^4$  is a linear or branched alkylene group having 1 to 10 carbon atoms, and  $\text{R}^5$  is a hydrogen atom or an acyl group having 1 to 10 carbon atoms; and

$\text{R}^2$  is a hydrogen atom or a methyl group,

(II) repeating units which are derived from a monomer having a urethane or urea bond and one [a] carbon-carbon double bond, but no fluorine atom,

(III) repeating units which are derived from a monomer having a carbon-carbon double bond, the homopolymer of said monomer having a glass transition temperature ( $T_g$ ) of  $50^\circ\text{C}$  or less,

(IV) optional repeating units which are derived from a monomeric compound of the formula:



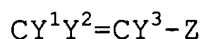
wherein  $\text{A}^1$  is a hydrogen atom or a methyl group;

$\text{X}^1$  is  $-\text{O}-$ ,  $-\text{CH}_2-$  or  $-\text{NH}-$ ,

$\text{A}^2$  is a hydrogen atom, a hydrophilic group or a group having a hydrophilic group,

and

(V) optional repeating units which are derived from a monomeric compound of the formula:



wherein  $Y^1$  and  $Y^2$  are each a hydrogen atom or a fluorine atom;  
 $Y^3$  is a hydrogen atom, a fluorine atom, a chlorine atom or a methyl group; and  
Z is a chlorine atom or a chlorine atom-containing group,

wherein at least one of the repeating units (IV) and the repeating units (V) is essential.